

Addressing CCS Liability

Using a Risk Log to Better Define "Liability" and Consider Mitigation Options

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Sample of Risk Log

1. Siting 12-36 months	2. Construction 12-36 months	3. Operation 1-30 years +	4. Closure 12-36 months	5. Post Closure Time limit or Performance driven	6. LT Maintenance & Stewardship Indefinite post closure
1.1 Worker safety 1.2 Damage to private property 1.3 Incomplete site characterization 1.4 Public Opposition 1.5 Failure to obtain access or storage rights 1.6 Failure to obtain permit 1.7 Drilling "dry hole's"	2.1 Worker safety 2.2 Damage to private property 2.3 Damage to confinement zone (by fracturing a cap for example) 2.4 Contractor delays / cost overruns 2.5 Poor well construction 2.6 Failure to adequately complete old wells/boreholes	3.1 Worker safety – OSHA 3.2 Worker safety – CO ₂ exposure 3.3 Groundwater: mechanical failure 3.4 Groundwater: confinement zone failure 3.5 Property damage (mineral rights) 3.6 Ecosystem degradation (terrestrial or aquatic) 3.7 Public exposure to CO ₂ release (surface pipeline leak, borehole, well blow out) 3.8 Prolonged atmospheric release	4.1 Worker safety 4.2 Improper well abandonment 4.3 Failure to adequately install MMV system 4.4 Materials failure	5.1 Groundwater: CO ₂ and geochemical reaction products 5.2 Groundwater: brine or gas displacement 5.3 Subsurface property damage (mineral rights) 5.4 Ecosystem degradation (terrestrial or aquatic) 5.5 Public exposure to CO ₂ 5.6 Atmospheric release 5.7 Lawsuits	6.1 LT groundwater contamination 6.2 LT Subsurface property damage (mineral rights) 6.3 LT ecosystem degradation (terrestrial or aquatic) 6.4 LT public exposure to CO ₂ 6.5 LT atmospheric release (loss of credits / compliance) 6.6 LT lawsuits 6.7 LT third party damage to confinement zone 6.8 Seismicity 6.9 Change in law

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Sask. project to pipe CO2 to Montana

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A \$245-million climate-change initiative being pursued by officials in Montana and Saskatchewan could create North America's first large-scale project for storage of greenhouse gas.

Gov. Brian Schweitzer says the project would capture a daily 900 tonnes of carbon dioxide produced by a coal plant in Canada, then send it through pipelines to a Montana site where it would be injected underground for storage.

Carbon dioxide - a byproduct of burning fossil fuels - is a major driver of climate change. Researchers and policy-makers around the globe are scrambling for ways to capture the gas before it escapes into the atmosphere.

The Saskatchewan-Montana Project would target one of world's largest sources of greenhouse gases - coal-fuelled power plants.

Schweitzer says that to fund Montana's share of the project, he will seek \$100 million from the stimulus package working through the U.S. Congress.

With government officials aiming to get pipelines in place and start moving carbon dioxide within two years, the proposal is meant to jump-start carbon capture efforts now bogged down by political uncertainty and technological challenges.

"Carbon dioxide is a concern that's global," Schweitzer said. "What could be better than having two of the largest carbon dioxide-producing countries in the world working together on this?" The carbon would be captured from an existing 300-megawatt power plant owned by SaskPower. It then would be piped more than 80 kilometres south into northern Montana, where the gas would be injected deep underground for storage.

The carbon dioxide could later be withdrawn for use in oil production - a long-standing industry practice in which the carbon dioxide is pumped into the ground to help push oil out of aging reserves.

Other carbon capture proposals involving a new generation of coal plants are in the works in Montana, Wyoming, Ohio, Illinois and elsewhere. Most involve a process known as gasification, where coal is turned into a gas before it's used to generate electricity.

That process makes it far simpler to capture carbon dioxide.

Yet most of those plants remain years from completion while developers work out kinks in new technologies.

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